

S.N. 10/087,584

REMARKS

Claims 1-6, 8-12 and 14-21 are pending in this application.

Claims 9-12 and 21 are withdrawn from consideration.

Claims 1-6, 8 and 14-20 are rejected.

'102 rejections of claims 15 and 17-20

The office action dated 17 December 2004 indicates that claims 15 and 17-20 are rejected under 35 USC §102(e) as being anticipated by Nara U.S. Patent Publication No. 2002/0060819. An amendment to claim 15 was made for clarity, not in response to the '102 rejection (the amendment also overcomes an objection to claim 15). The '102 rejection of claims 15 and 17-20 are respectfully traversed.

Amended claim 15 recites a system for processing a digital image corresponding to a scanned document. The system comprises statistical analyzer for analyzing the image to obtain statistical data; function derivator for deriving background removal data for the image based on the statistical data; and data storage for storing the image and the background removal data together.

Figure 14 of Nara shows a copier 1 including a scanner 2 and a printer 3. The scanner 2 includes a shading unit 43, a background detection unit 46a, a background removal unit 52, and an exposure unit 22. The background detection unit 46a detects the background level (para. 136). The background removal unit 52 removes noise from the background, using the background level as a threshold (paragraphs. 150-151).

Nara does not teach or suggest producing statistical data. The office action states that Nara discloses statistical data in paragraph 137. However, this paragraph simply states that blocks 47 and 48 remove "an effect of noise" and

S.N. 10/087,584

that a peak detector 49 obtains a background level Dba. Paragraph 137 of Nara is silent as to how the filtering is performed and how the background level is derived. However, paragraph 57 states that a smoothing filter 48 is used to remove noise from raw image data Drd0. Nara does not teach or suggest that any sort of statistical analysis is performed or that statistical data is produced.

Nara doesn't teach or suggest deriving background removal data based on the statistical data. The peak detector 49 obtains Dba from smoothed image data, not from statistical data. The office action states that paragraphs 161 and 164 of Nara discloses a function derivator for deriving background removal data for the image based on the statistical data. However, all these paragraphs discuss is a comparison of a gamma characteristic of the scanned data before and after clipping, and before and after background noise removal.

Nara doesn't teach or suggest data storage for storing the image and the background removal data together. Paragraph 88 of Nara indicates that block 50 combines the background level Dba with the raw data Ddr0 to produce data Ddr1. According to paragraph 98, the combined data Ddr1 is processed by processing unit 51, and the processed image is stored in memory 58. Nara does not teach or suggest that the background level Dba is also stored in memory 58.

Paragraph 146 of Nara indicates that threshold value Dth1 may be attached to image data Drd1 to form image data Drd2. Paragraph 148 states the image data Drd2 is supplied to a processing unit 51, and then the background removal unit 52. Figure 14 suggests the processed image is stored in image memory 58. Nara provides no reason to store the threshold value Dth1 in the image memory 58.

Clearly, Nara does not teach or suggest a single element of claim 15. Therefore, claim 15 and its dependent claims 17-20 should be allowed over Nara alone.

S.N. 10/087,584

'103 rejections of claims 1-6, 8, 14 and 16

The office action dated 17 December 2004 indicates that claims 1-6, 8, 14 and 16 are rejected under 35 USC §103 as being unpatentable over Nara in view of Stolfo U.S. Patent No. 5,668,897. The '103 rejection is respectfully traversed.

Claim 1 recites a method of processing a digital image corresponding to a scanned document. The method includes analyzing an image to obtain statistical data; and deriving background noise removal data for the entire image based on the statistical data.

As discussed above, Nara does not teach or suggest producing statistical data or deriving background noise removal data for the entire image based on the statistical data. Therefore, claim 1 and its dependent claims 2-3, 5-6, 14 and 16 should be allowed over Nara.

Claim 1 has been amended to move the storage and "user selection" to a new claim 22. New claim 22 recites that the method of claim 1 further comprises storing the entire image and the background noise removal data, the stored image and the stored data made available for interactive processing; and providing user selection. In one case of the user selection, the stored image and the stored data are used to remove background noise from the stored image prior to rendering the stored image. In another case of the user selection, background noise removal in the stored image is bypassed prior to rendering the stored image. Thus, the user selection allows the stored image to be displayed with and without background noise removed.

The method of claim 22 allows a user to display the document prior to printing. The user can display the document with the background removal and without the background removal. The user can then decide whether to print the document with background removal or the document without background removal. Nara does not teach or suggest such capability.

S.N. 10/087,584

A particular advantage of the method of claim 22 concerns multi-page documents. Using the method of claim 22, the background removal data is available for each page. The user can decide whether to perform background removal for each page, after all of the pages have been scanned.

Nara does not teach or suggest storing background noise removal data and making the data available for interactive processing such that a user can render the stored image with and without background noise removal. Paragraphs 98 and 158 suggest that the user has an option of performing or not performing background noise removal prior to rendering. However, the user must make a hard choice. Either the background noise is removed, or it is not removed. Once a new page is scanned in, the data is lost, and the choice can no longer be made. If a user decides to remove background noise at a later time, the page must be rescanned.

The office action contends that paragraphs 98 and 158 of Nara suggest an interface for, in a first case, using the stored image and the stored data to remove background noise from the stored image prior to rendering the stored image; and in a second case, bypassing background noise removal in the stored image prior to rendering the stored image. However, this contention is not correct. First, for the reasons above, Nara does not teach or suggest storing the background noise removal data (Dba) in memory 58.

Second, Nara does not allow both options on the same raw image data (Drd0). Nara allows only one option, either removing the background or not removing the background noise. Paragraph 158 simply states that a CPU 57 can generate a signal that causes the background noise removal to be disengaged. Paragraph 98 states that an image is stored in memory 58 prior to background noise removal. Paragraphs 98 states explicitly that "the background noise removal by the background removal unit 51 is performed or not performed

S.N. 10/087,584

according to the user selection when the image data is supplied to the exposure unit." Therefore, paragraphs 98 and 158 do not teach, hint or remotely suggest that the Nara's user selection allows a user to (a) use the stored image and data to remove background noise from the stored image prior to rendering the image and (b) bypass background noise removal in the stored image prior to rendering the stored image

Stolfo does not teach or suggest these differences between claim 22 and Nara. Therefore, new claim 22 should be allowed over the combination of Nara and Stolfo. Claims 4 and 8, which have been amended to depend from new claim 22, should also be allowed over the combination of Nara and Stolfo.

'112 rejections of claims 1 and 3

The office action indicates that claim 1 is rejected under the first and second paragraphs of 35 USC §112. These rejections have been rendered moot by the amendments above to claim 1.

The office action also rejects claim 3 under the first paragraph of 35 USC §112 for lack of support in the specification. This rejection is respectfully traversed. Claim 3 recites the background noise removal data includes a tonemap function or sampled values of the tonemap function. Support for this feature can be found in paragraph 0009 ("The image data and the tonemap function are then stored); and paragraph 0010 (a lookup table corresponding to the tonemap are stored) of the specification.

Restriction of claims 9-12 and 21

The office action indicates that claims 9-12 and 21 are withdrawn as a result of amendments made in the previous response. The office action states that amended claims 9-12 and 21 are drawn to a method of estimating tone background classified in class 382, subclass 199, whereas claims 1-6, 8 and 14-20 are drawn to a method of image processing classified in class 382, subclass

S.N. 10/087,584

254. Therefore, claims 9-12 and 21 are withdrawn from consideration for being directed toward a non-elected invention

This restriction requirement is respectfully traversed because the office action has not shown a serious burden on the examiner if restriction is not required. According to MPEP § 803 (Restriction – when proper), there are two criteria for a proper requirement for restriction between patentably distinct inventions:

- (1) The inventions must be independent or distinct as claimed; and
- (2) There must be a serious burden on the examiner if restriction is not required.

"For purposes of the initial requirement, a serious burden on the examiner may be *prima facie* shown if the examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search."

The office action has not shown separate classification (both groups are classified in class 382) or made any other showing of serious burden. Therefore, the restriction requirement should be withdrawn, and claims 9-12 and 21 should be examined.

Objection to drawings

Objections to Figures 2A and 2B are noted. A replacement sheet containing FIGS. 2A and 2B is attached. FIG. 2B has been revised to change the reference numeral for user selection module from "24" to "28." This revision was submitted as part of the last response. However, the replacement sheet did not provide numerals for data storage and the tonemap derivation. The attached replacement sheet identifies the data storage and tonemap with numerals 24 and 23.

S.N. 10/087,584

Paragraphs 30 and 33 refer to a data storage module 24. Paragraph 32 has been amended to recite user selection module 28 and data storage module 24.

Objection to declaration

The examiner is thanked for holding this objection in abeyance until allowability of at least one of the claims is indicated.

Conclusion

The examiner is respectfully requested to withdraw the rejections of the claims. If any further issues remain, the examiner is invited to contact the undersigned to discuss those remaining issues.

REPLACEMENT SHEET for PDNO 100202761-1 "User selected background noise removal for scanned images, Maurer et al.

2/9

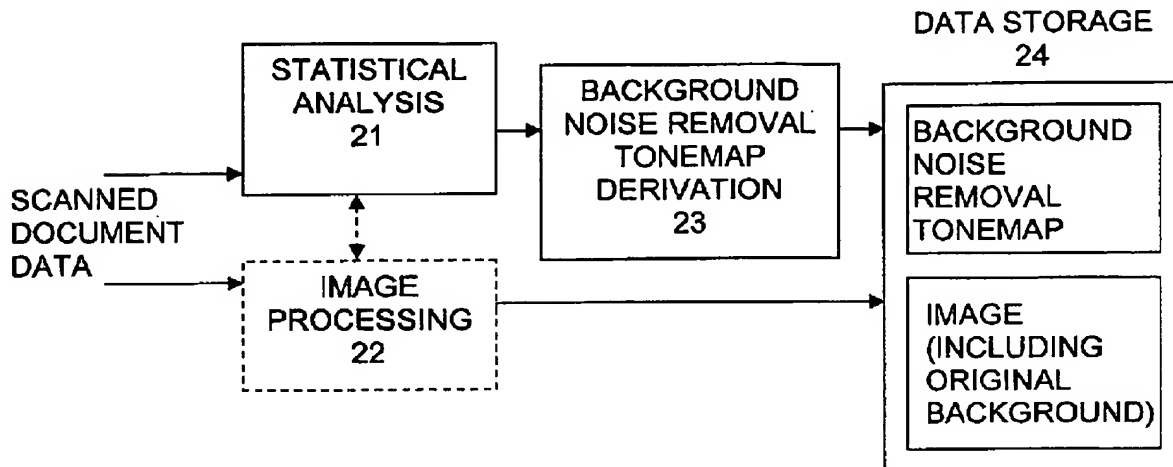


Fig. 2A

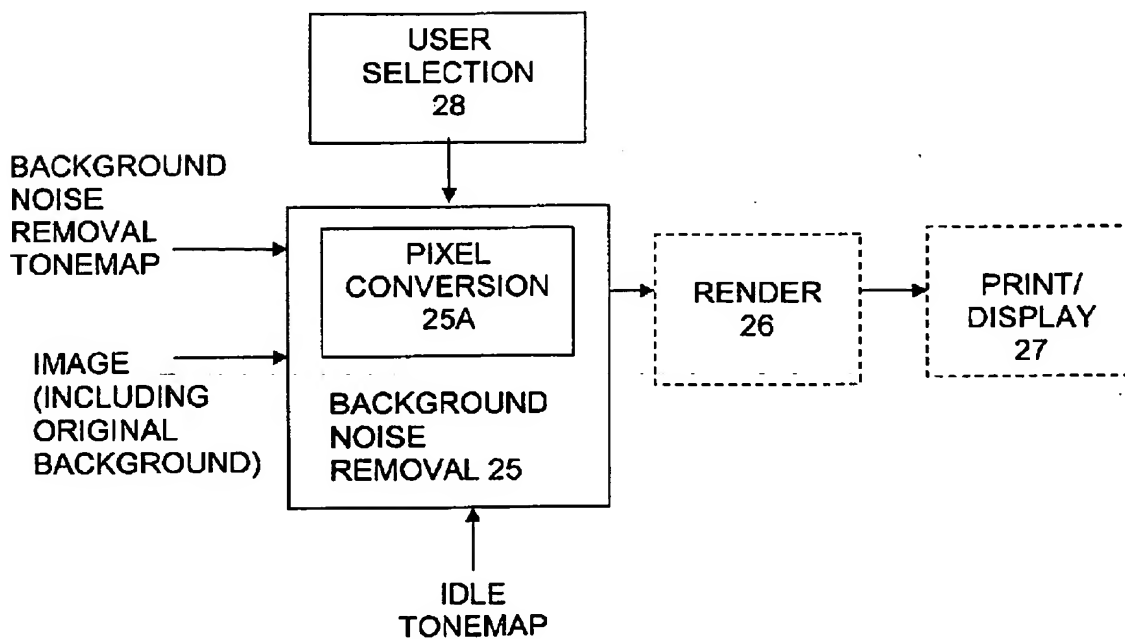


Fig. 2B